

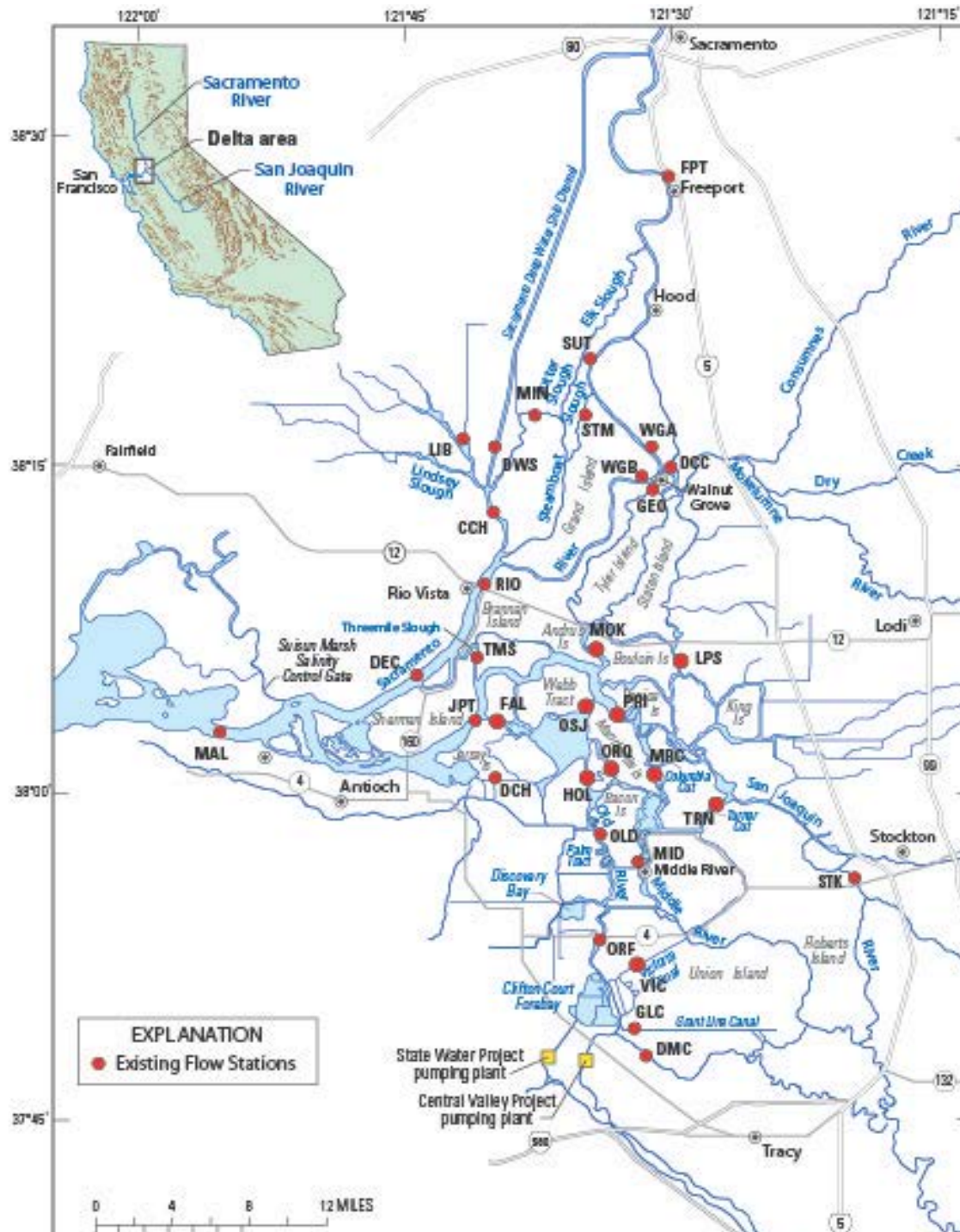
Implications of restoration on hydrodynamic and transport processes in the delta

A Valentine's Day Hangover

2/15/2013

Jon Burau, USGS

Flow Station Network (circa Nov 2011)



Base-line
pre-project
data



Conclusion

A restoration/conveyance masterplan is needed supported by a significant modeling capability (Hydro model + operations model).

Today's Plan

Discuss **REGIONAL SCALE** implications
of two restoration efforts:

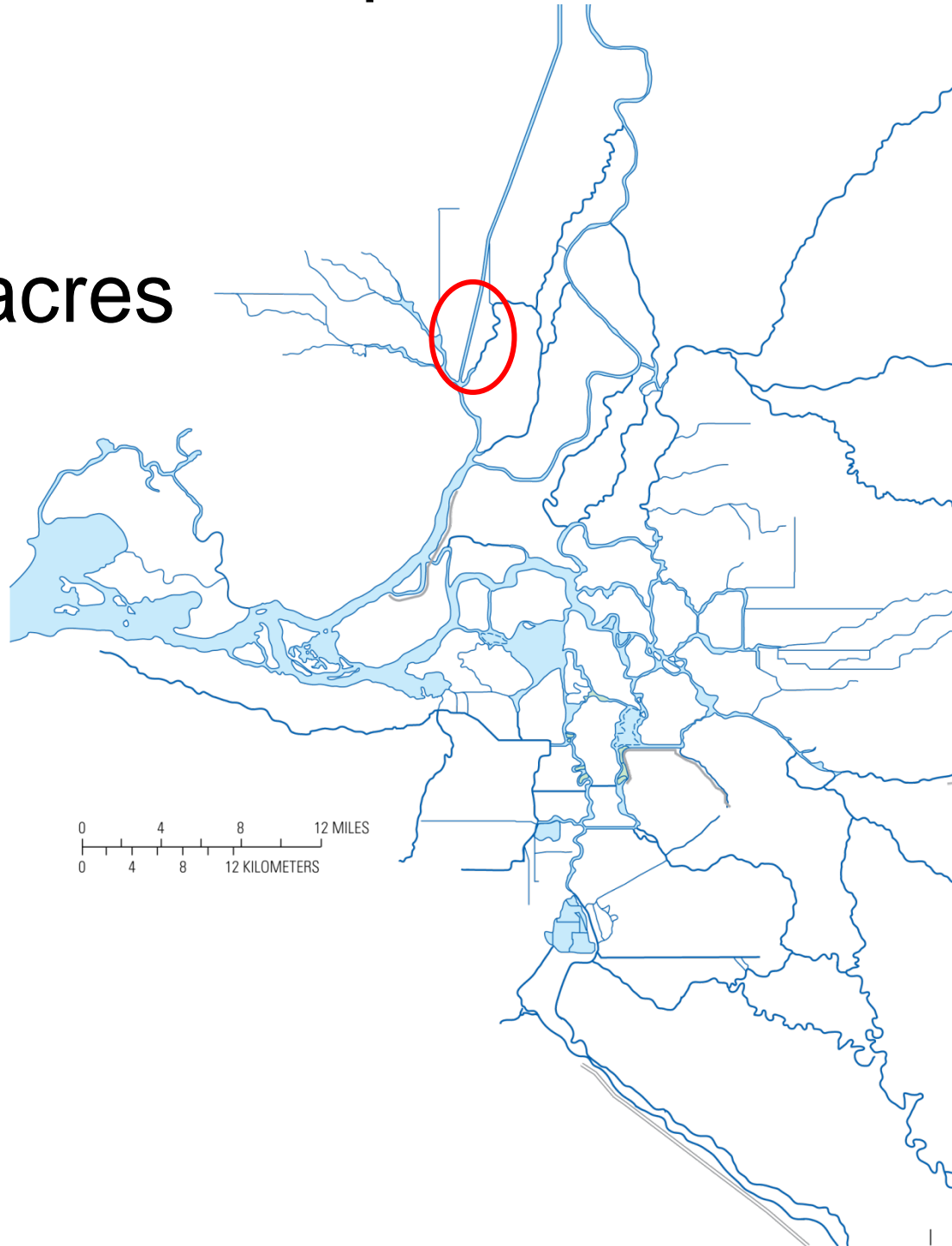
(1) Prospect Island

(2) "Sutter/Miner Bypass"

(Levee setback figment of my imagination)

Prospect Island

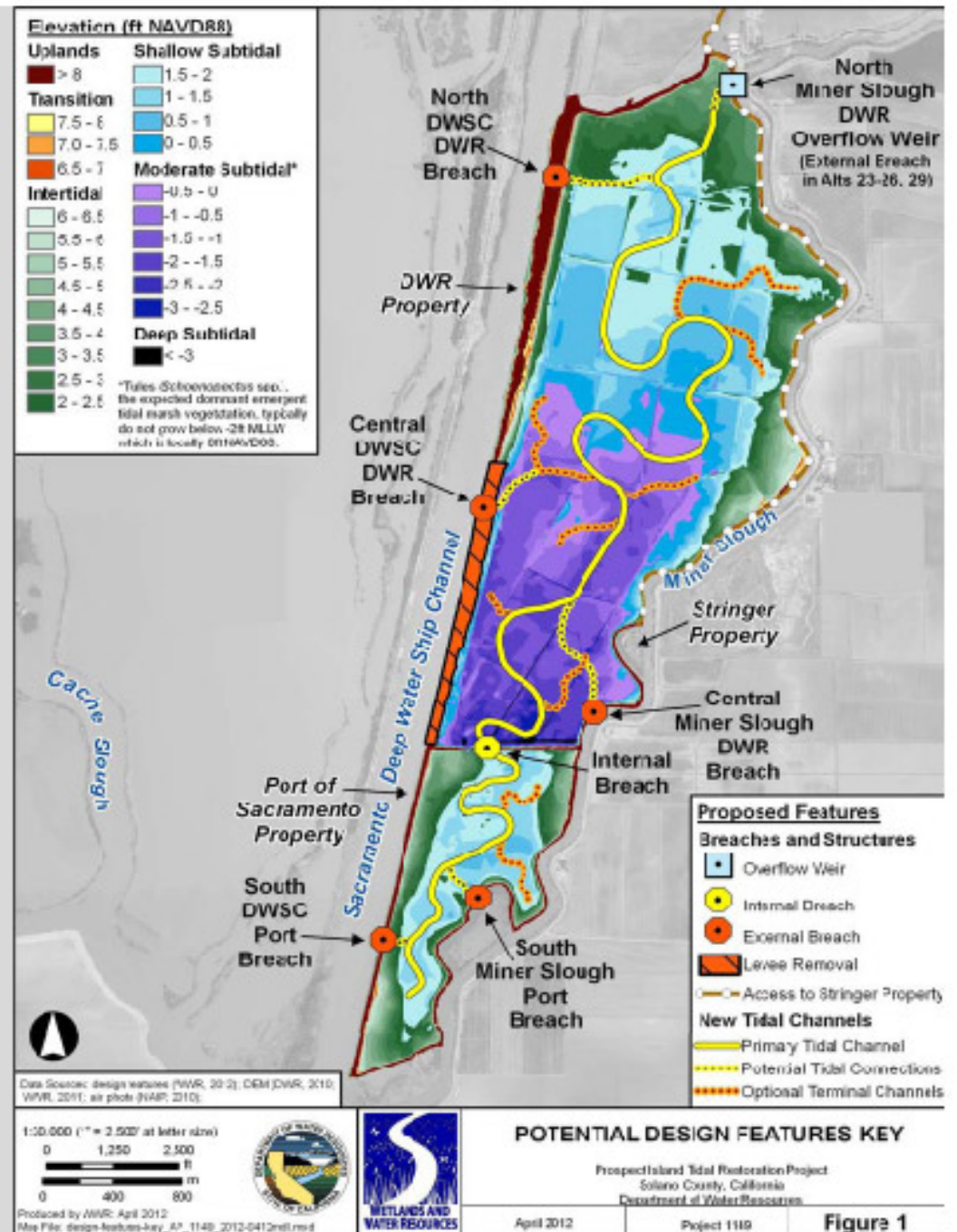
~1,300 acres



Prospect Island

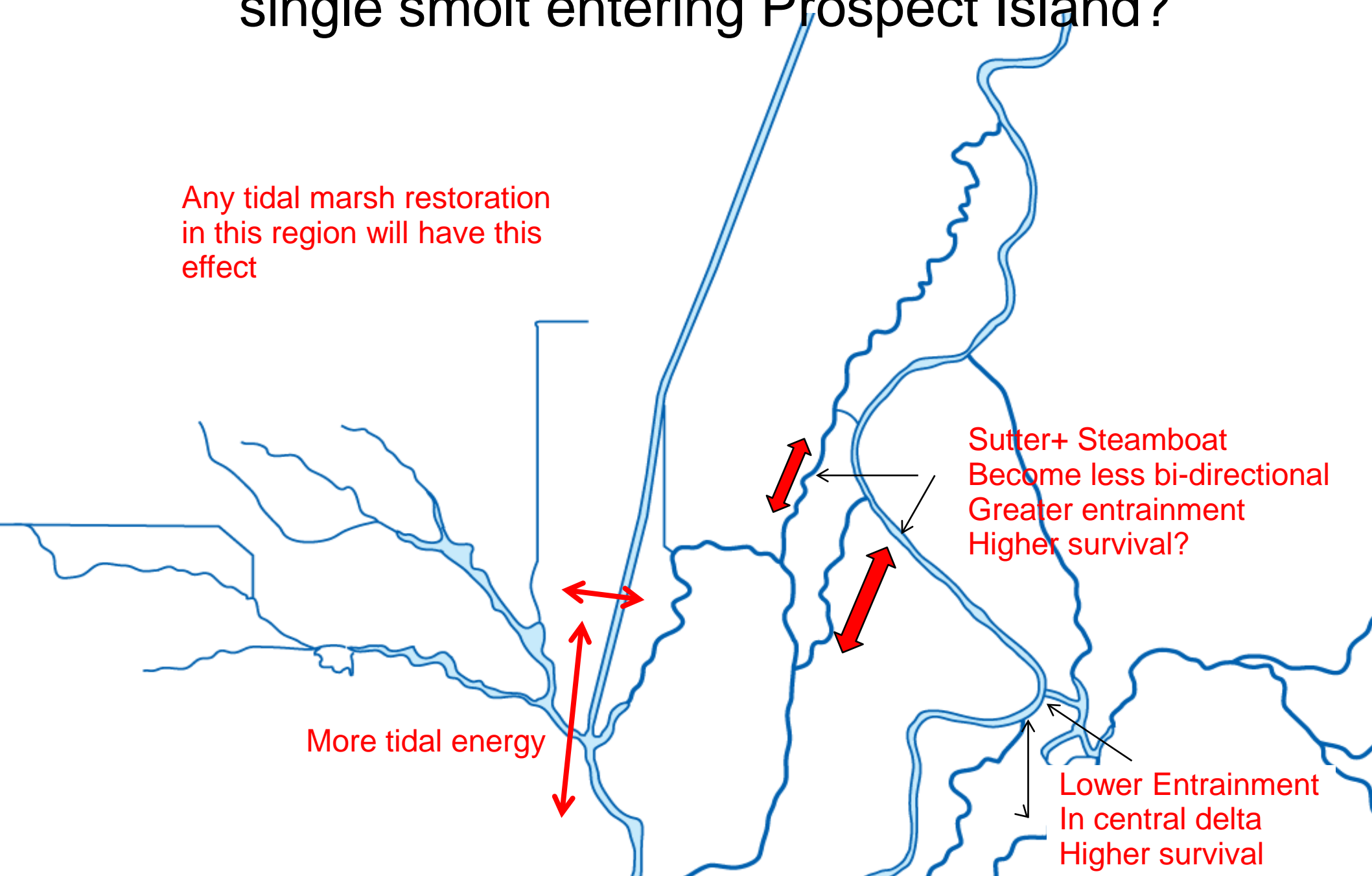
Design Features Key

- Breaches
- Overflow weir
- Primary channels
- Secondary branch channels
- Connecting channels depending on selected breaches
- DWR and Port properties
- Adjacent property access



Effect on Salmon outmigration? Increased population level survival without a single smolt entering Prospect Island?

Any tidal marsh restoration
in this region will have this
effect



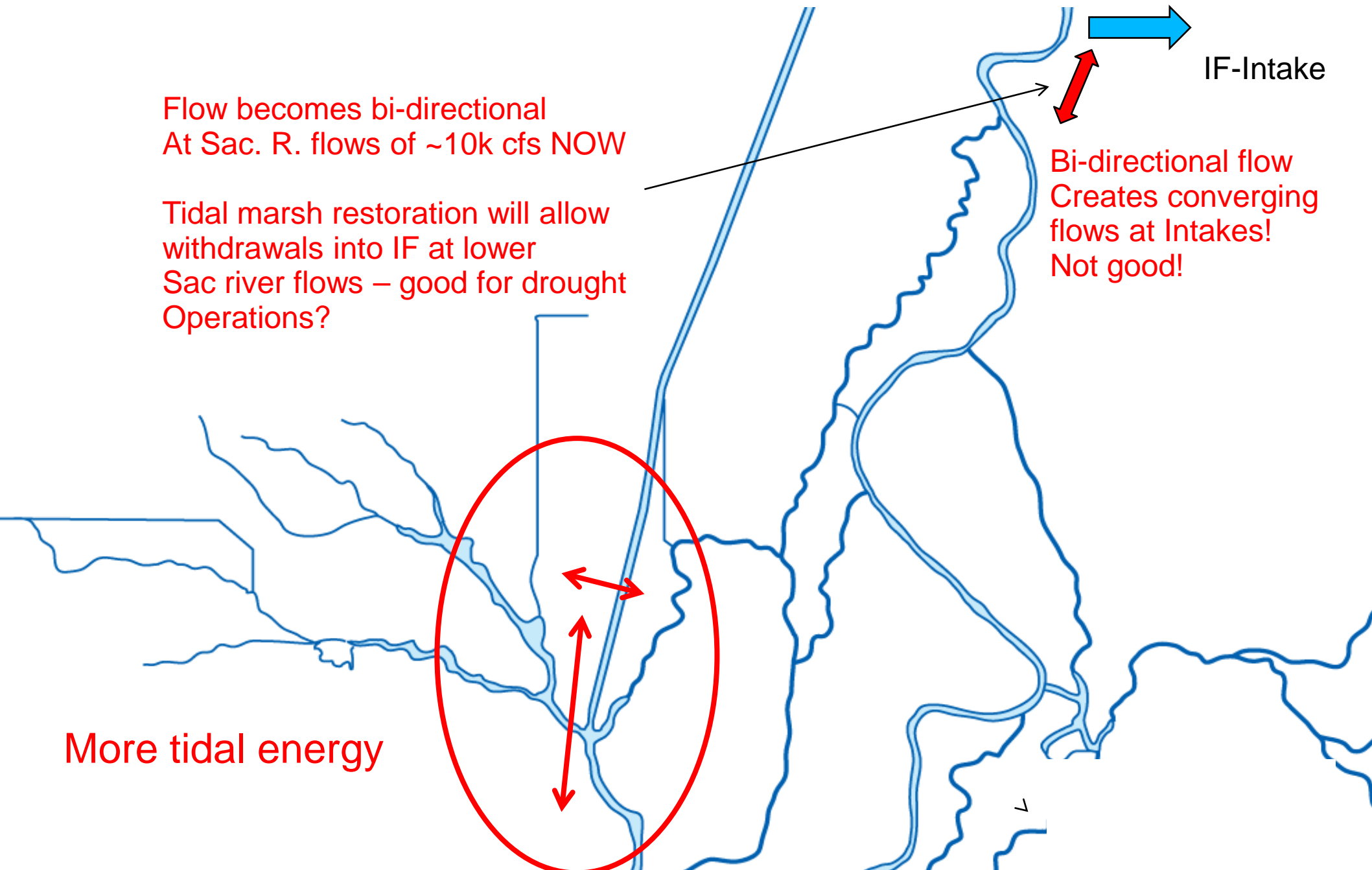
Greater water deliveries using Proposed Isolated Facility?

Flow becomes bi-directional
At Sac. R. flows of ~10k cfs NOW

Tidal marsh restoration will allow
withdrawals into IF at lower
Sac river flows – good for drought
Operations?

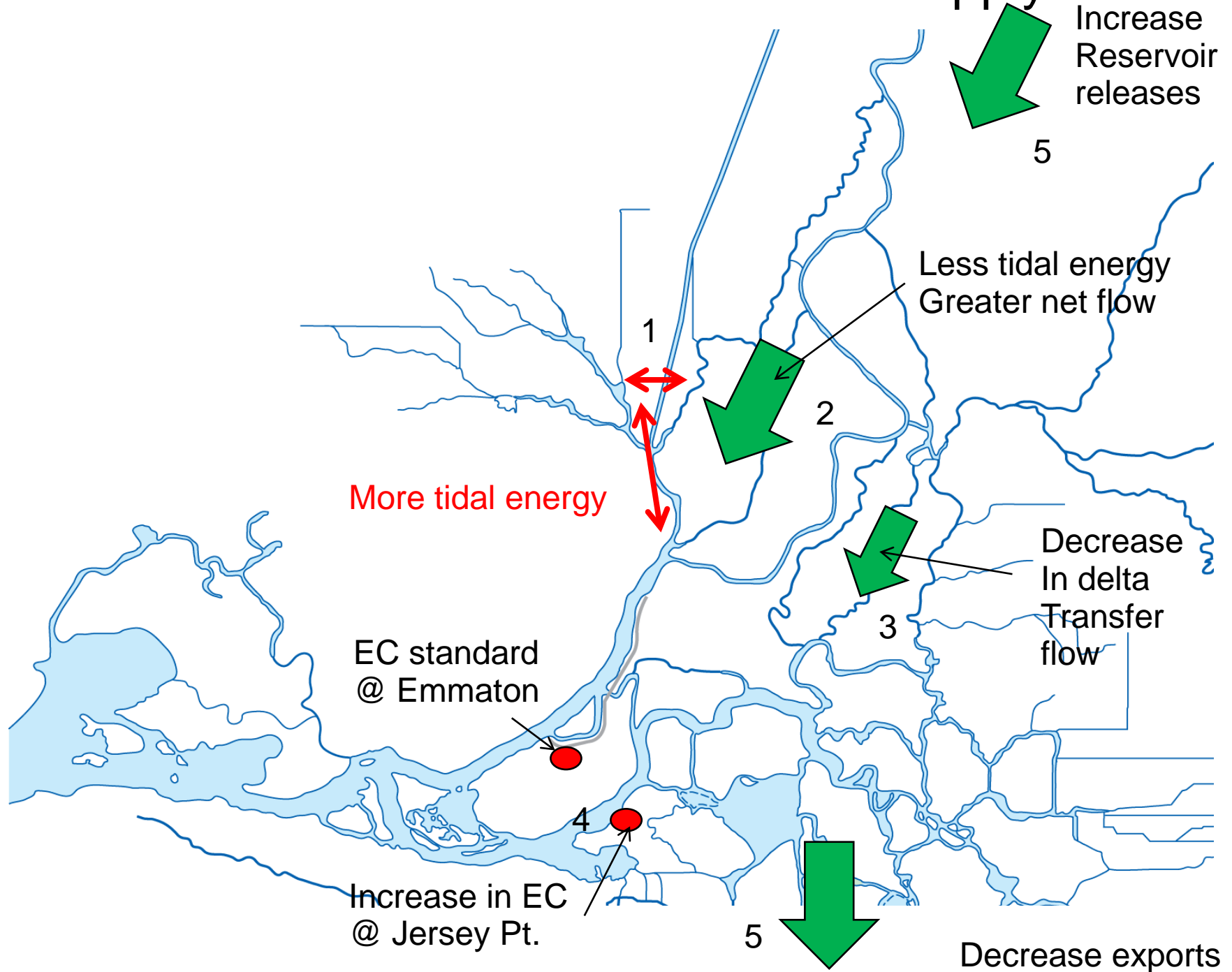
Bi-directional flow
Creates converging
flows at Intakes!
Not good!

More tidal energy

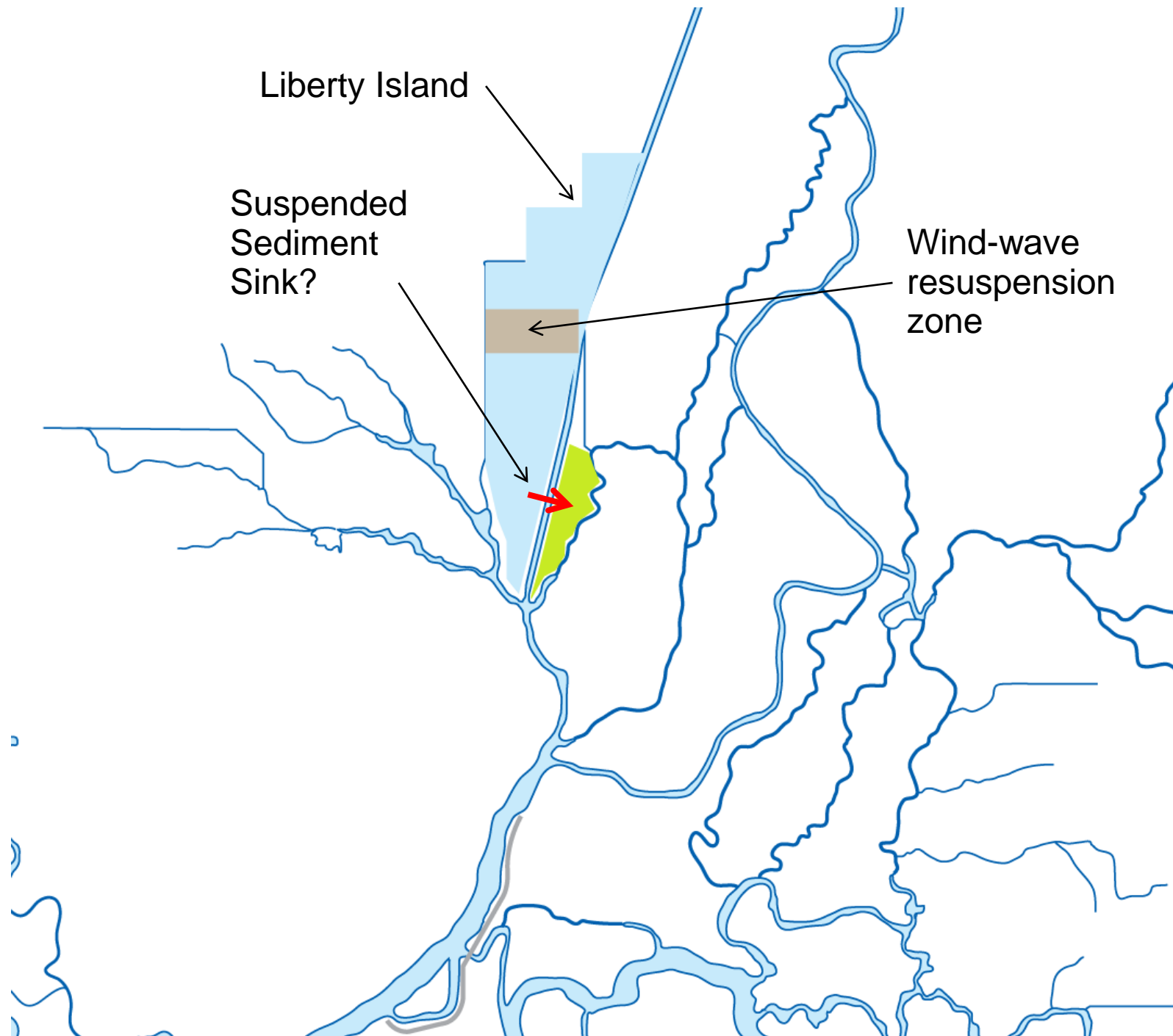


Effect on regional scale water quality?

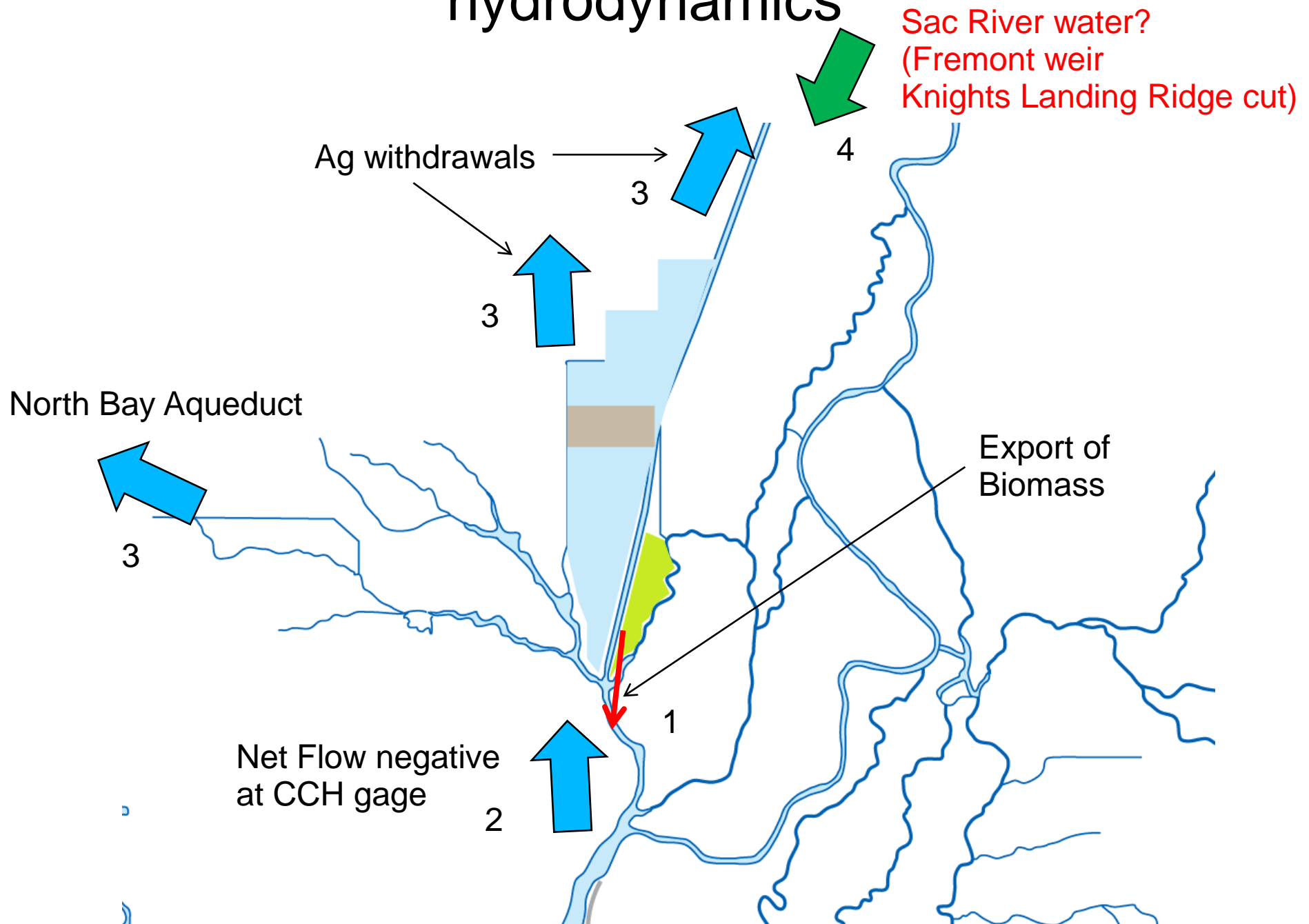
Which in turn could reduce water supply



Effect on local turbidity field?

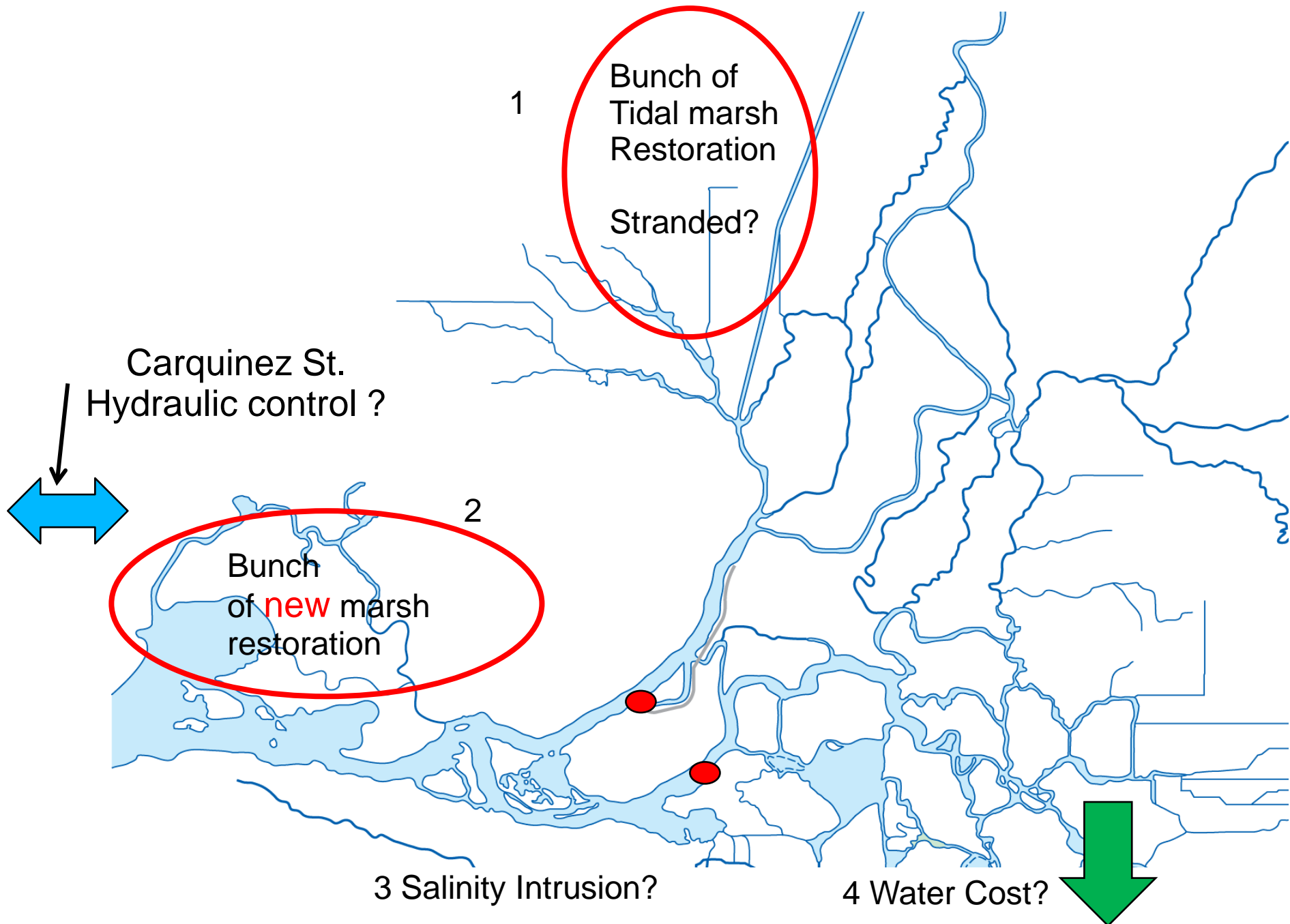


Effectiveness of restoration as donor habitat will be influenced by regional scale hydrodynamics



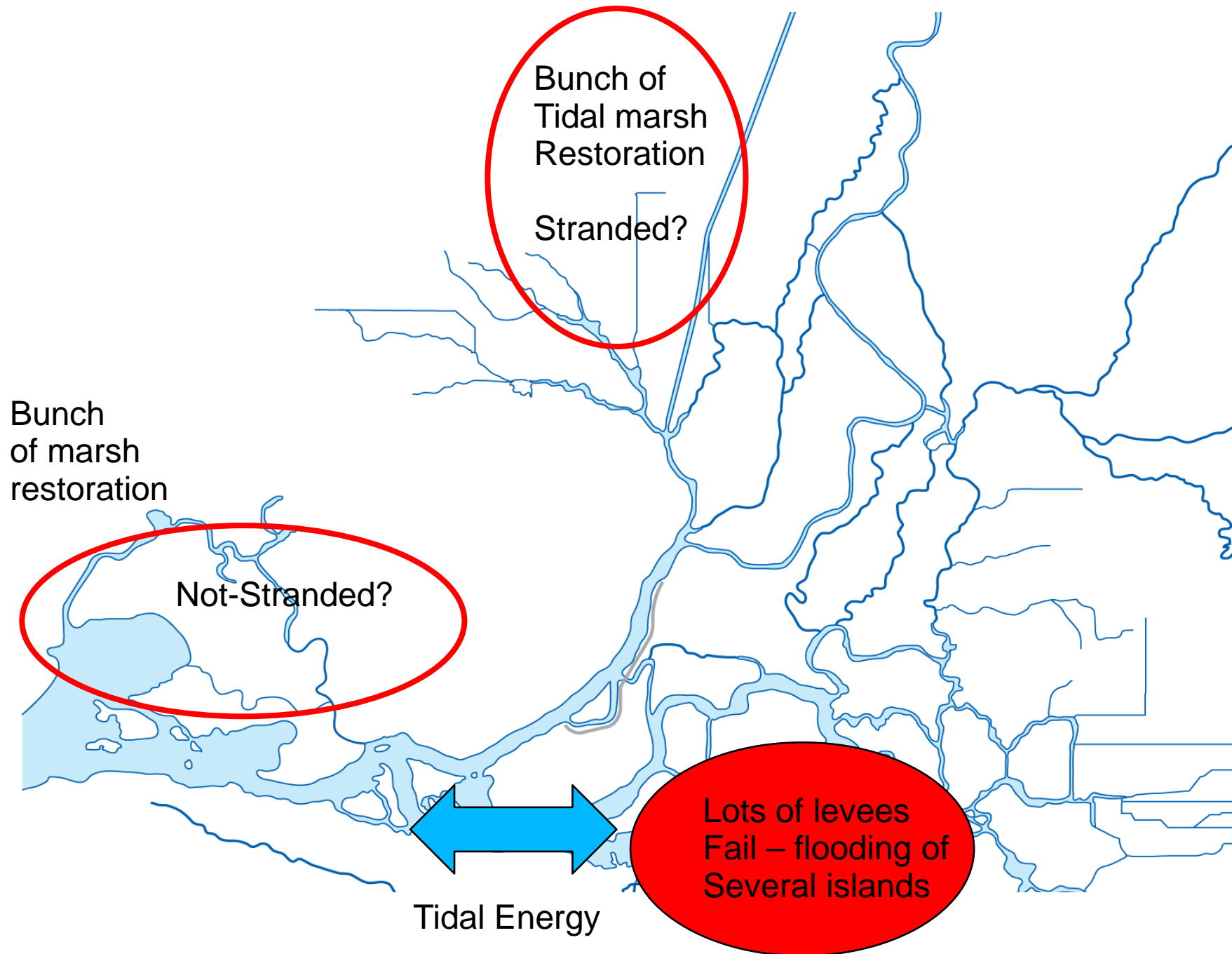
Finite Tidal Energy – take 1

Restoration Project Interaction

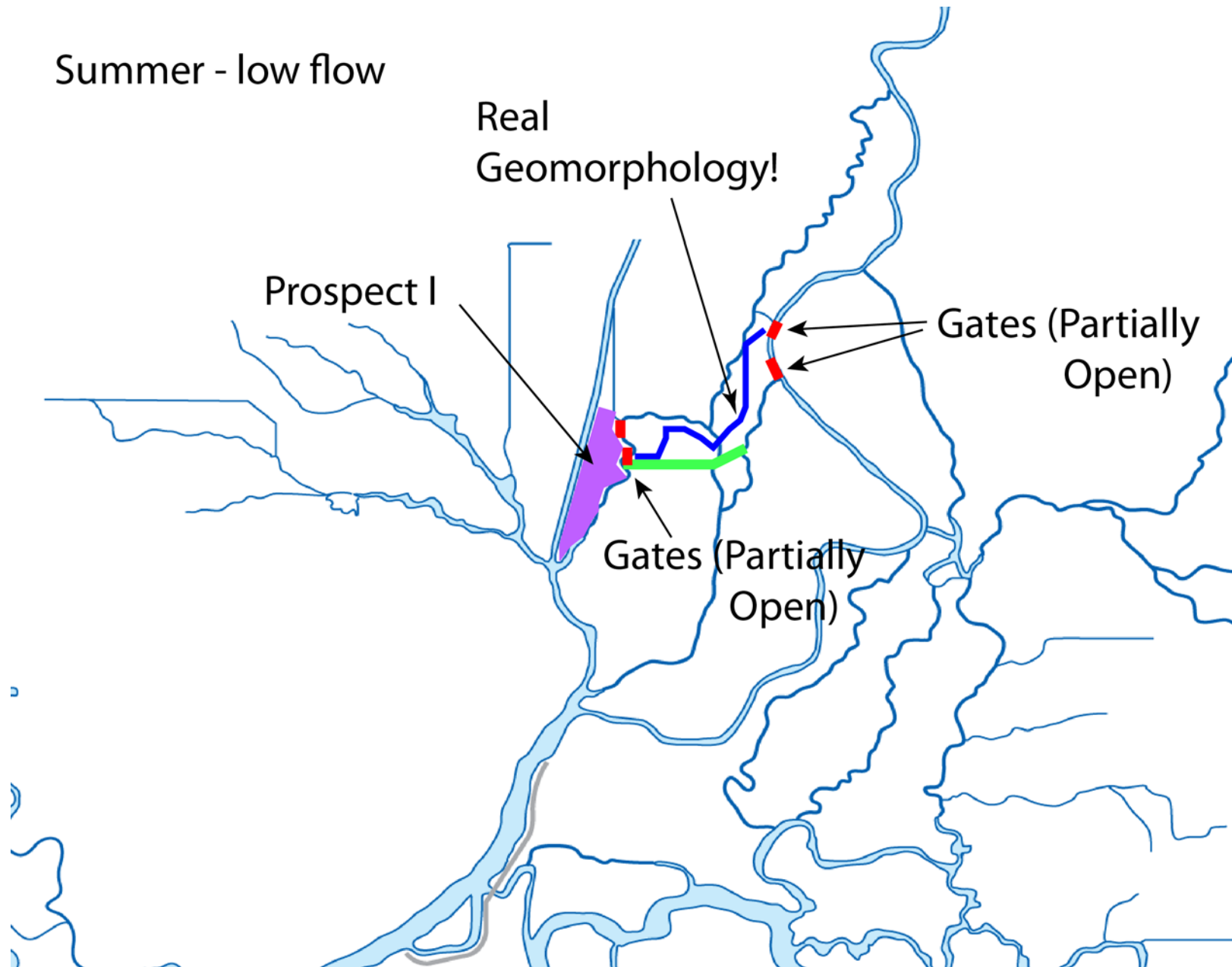


Finite Tidal Energy – take 2

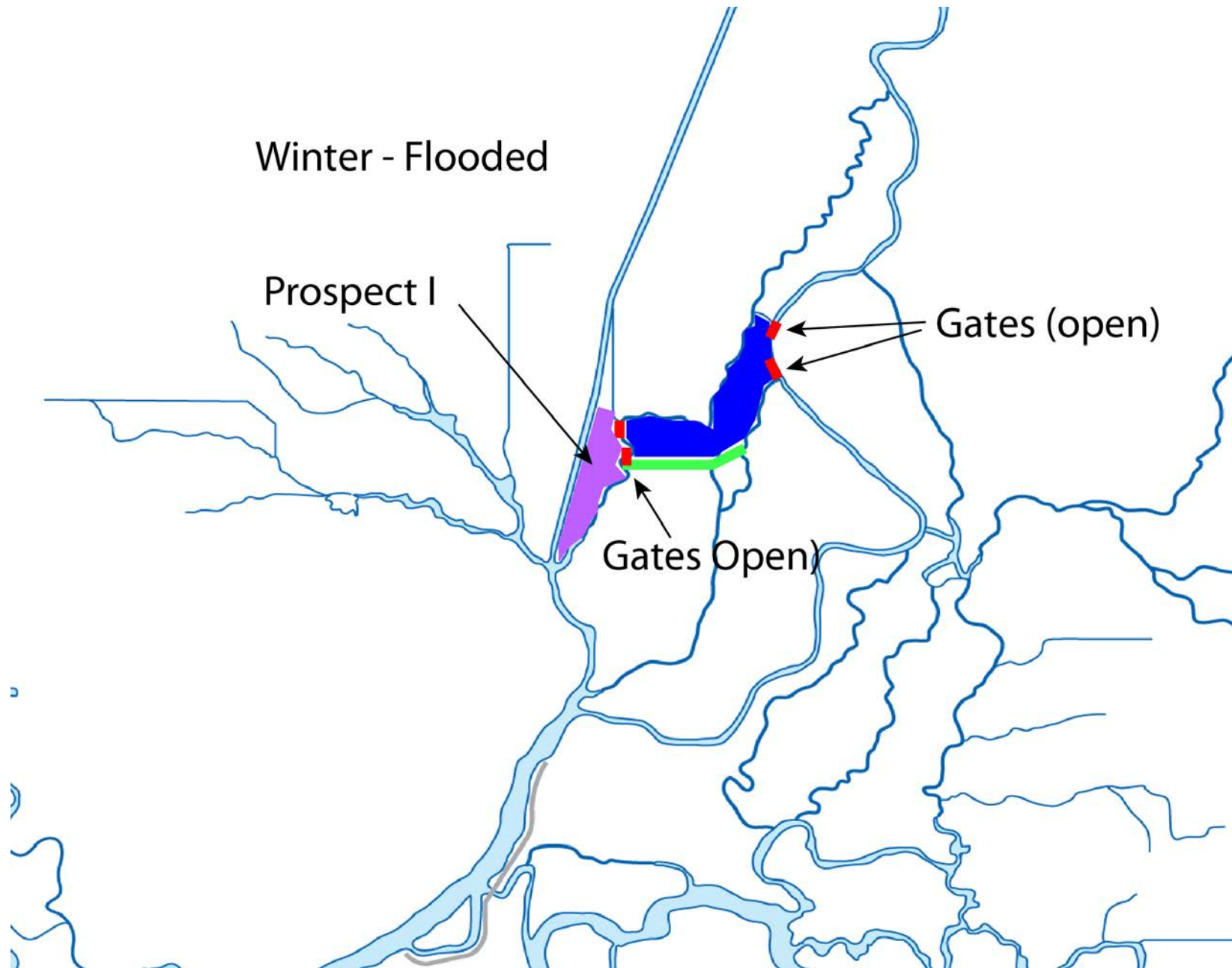
Levee Failure – Island Flooding



Crazy Idea.... Miner Bypass



Crazy Idea.... Miner Bypass



Whoa?! – Prospect Island
is in the way!

There are opportunity costs associated with
everything we do!

We have limited tidal energy, money and a
host of landscape constraints

How does Prospect fit in our longer term
plans?

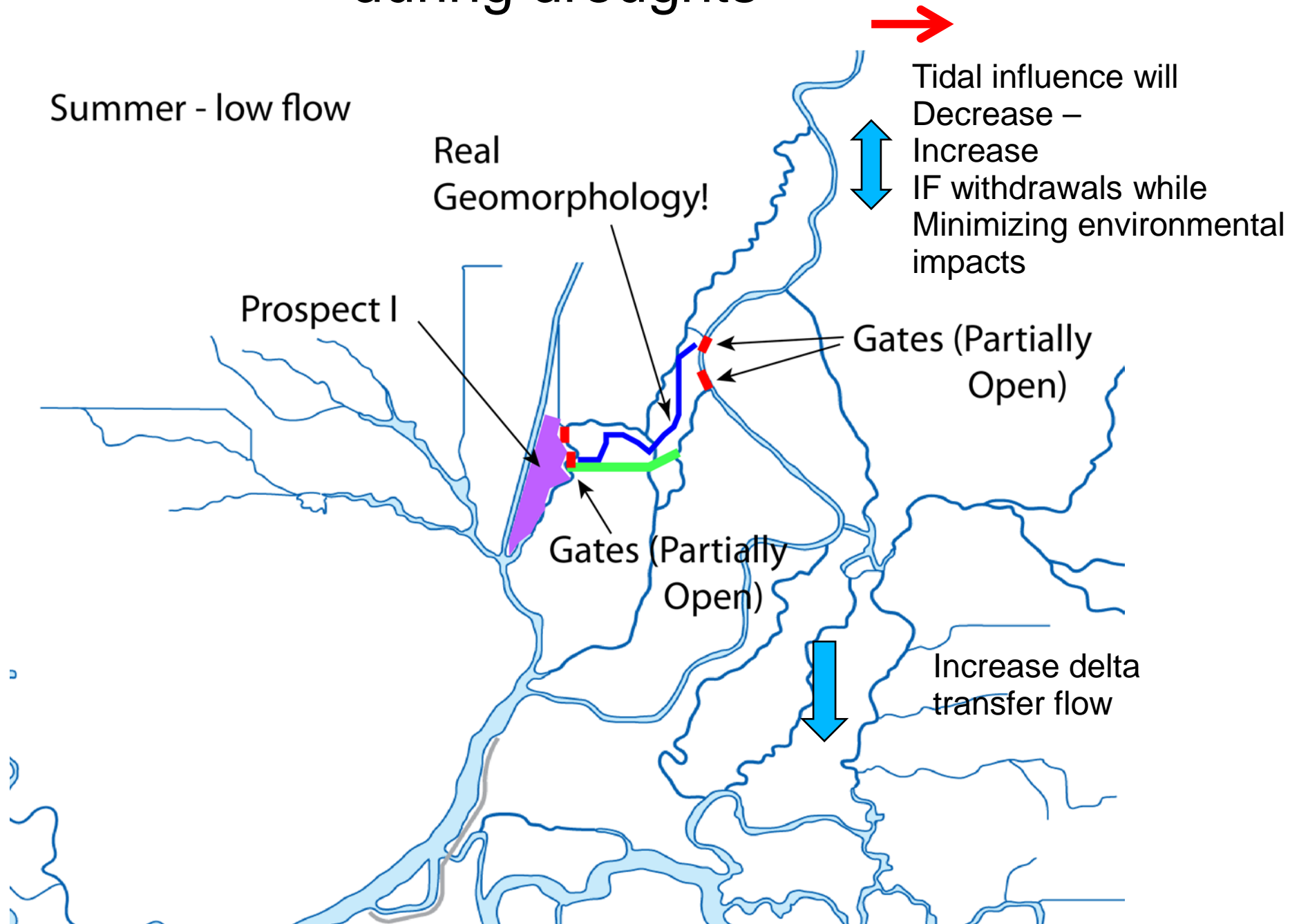
Increase water supply
during droughts

Simply Close Gates

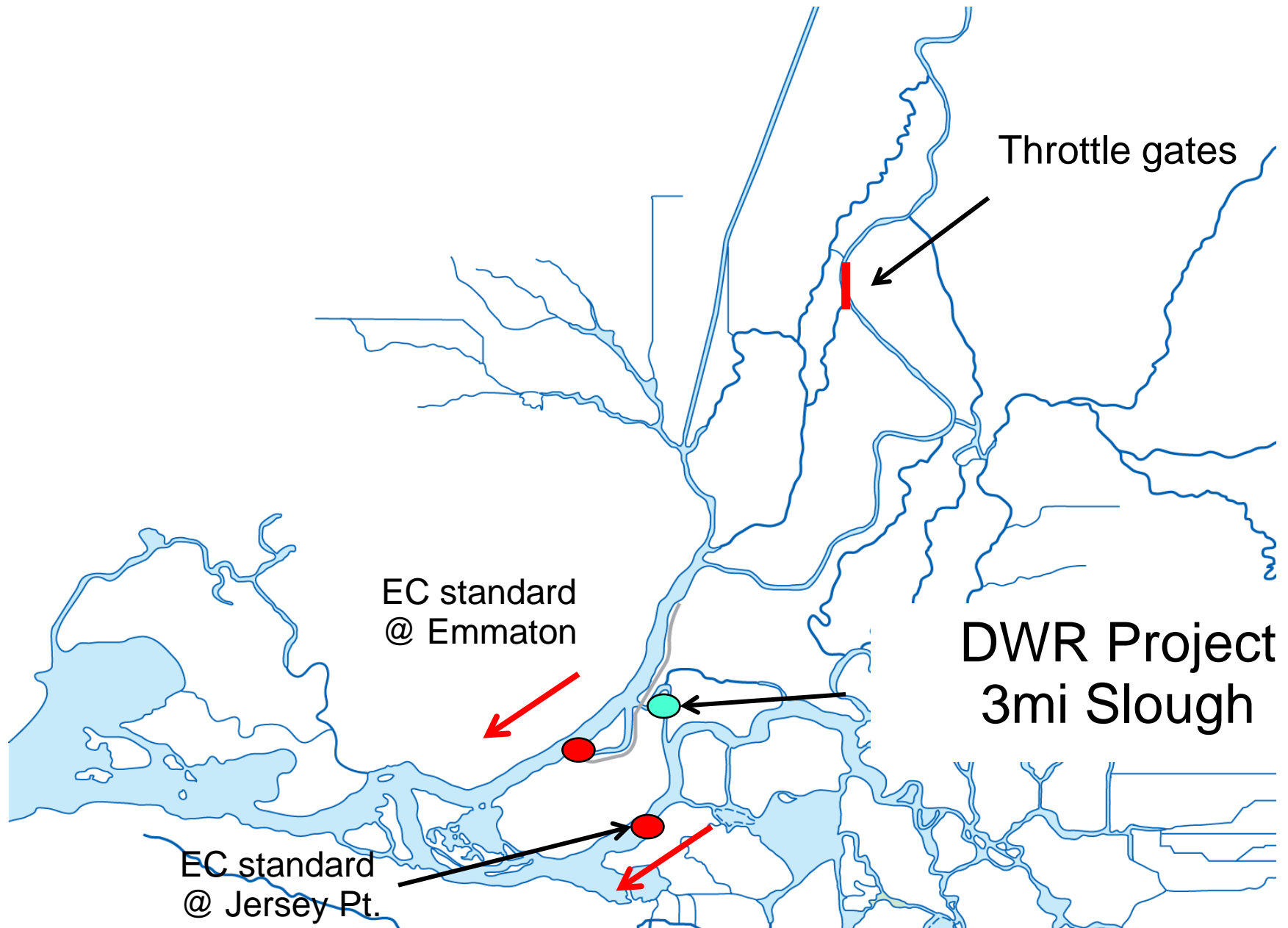
(1) Increase Delta Transfer
Flow

(2) Reduce upstream tidal
influence – increase IF
withdrawals

Increase water supply during droughts

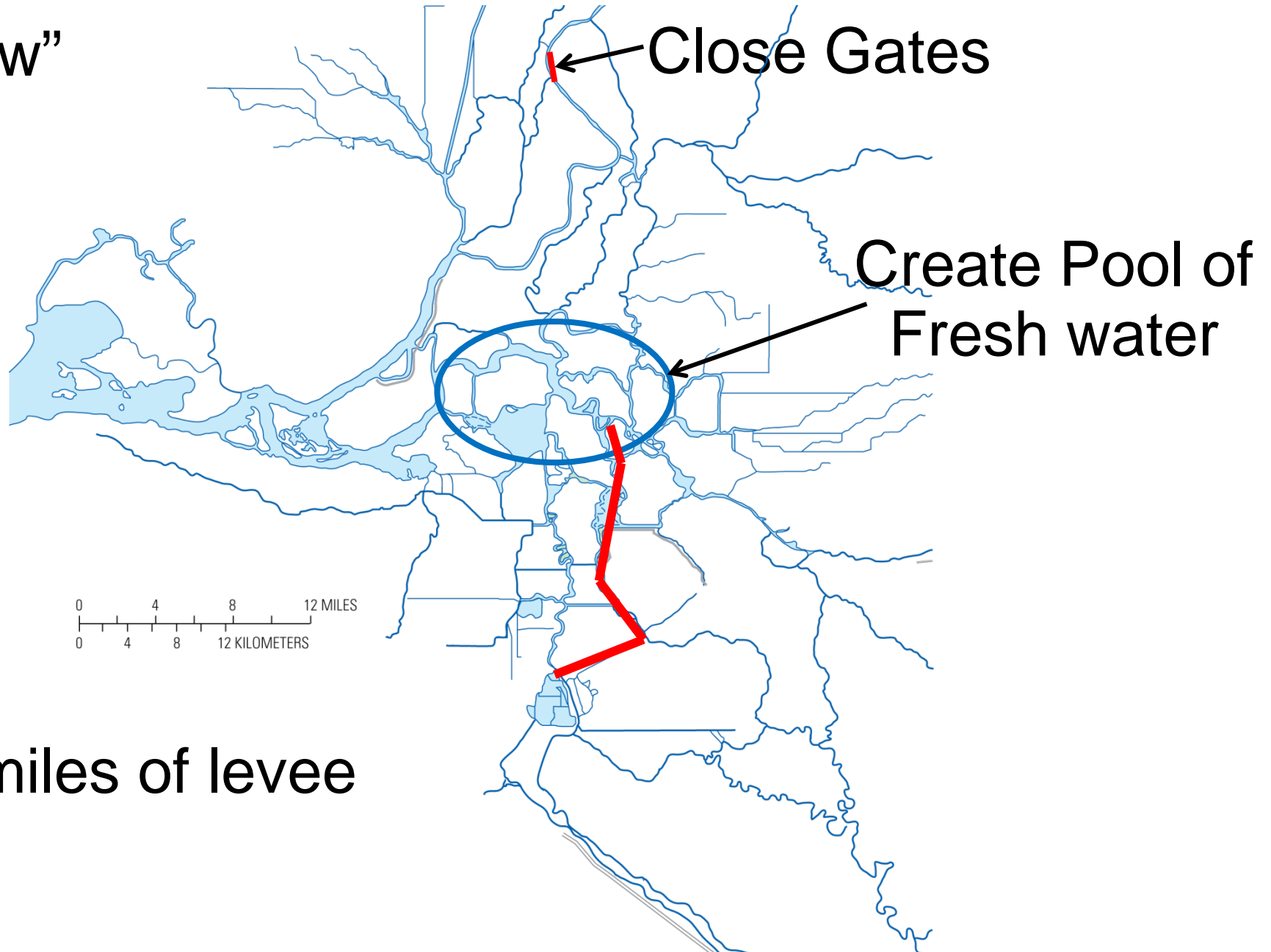


Balance Salinity between Sac and SJ – increase water supply



Rapidly restore exports after
large number of levee failures

“Straw”



~30 miles of levee

Increase salmon survival

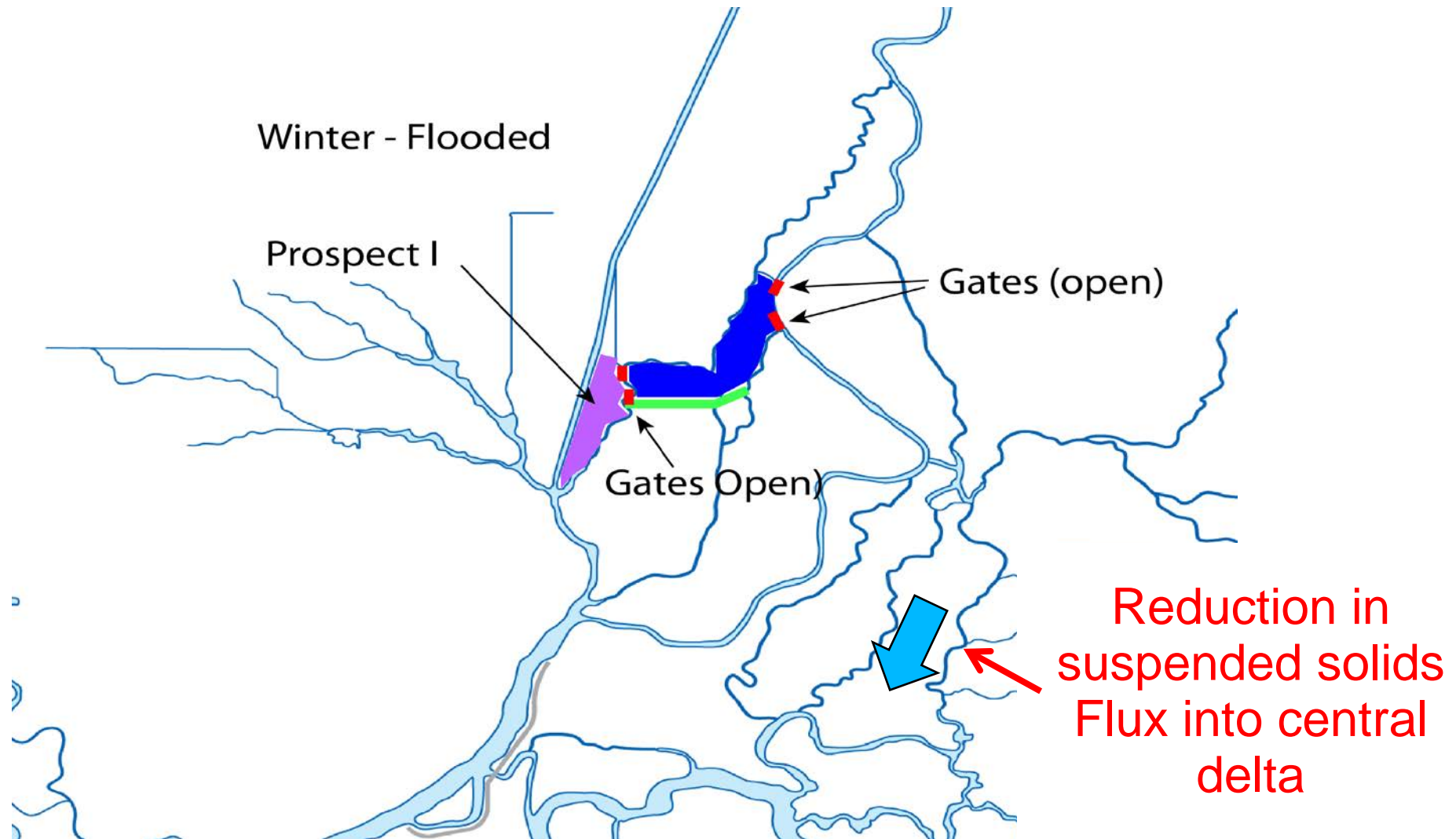
Open gates wide (winter operation)

- (1) Create bypass with actual habitat
(cover, forage)
- (2) Massively reduce delta transfer flow
and entrainment of juvenile salmon
into central delta

This map illustrates the Klamath River delta region, highlighting a proposed bypass habitat (shaded in light blue) and the impact of open gates on juvenile salmon. The map shows the river network and the location of the bypass habitat. A red arrow points to the bypass habitat, labeled "Bypass habitat!". A black arrow points to the "Prospect I" area. A black arrow points to the "Gates (open)" area. A black arrow points to the "Gates Open)" area. A large blue arrow points to the "Reduction in delta Transfer flow and Entrainment of juvenile salmon" area. The text "Winter - Flooded" is also present.

North delta salmon survival ~ 20-25% (100km)

Massive Reduction of Suspended Solids flux into central delta



Attract delta smelt into north delta?
Keep delta smelt out of central and
south delta?

Conclusions

At the restoration scale proposed:

- (1) There will be **REGIONAL SCALE** implications to proposed restoration efforts
- (2) There will be interactions among restoration efforts

Final Conclusion

A restoration/conveyance masterplan is needed supported by a significant modeling capability (Hydro model + operations model).

Tour?

